# Advanced Switches for Soft Blackouts

**Contract #:** 500-00-018
**Contractor:** California State University, Chico Research Foundation
**Contract Amount:** $800,000
**Contractor Project Manager:** Bill Wattenburg (925) 938-5955
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**Status:** Active

**Project Description:**
The purpose of this project to research methods to lessen the impact of rolling blackouts that can occur in California during Stage 3 power emergencies. During previous Stage 3 power emergencies rolling blackouts have been instituted to prevent total electric system collapse. These blackouts are very expensive to California residents and businesses and are done in a disruptive manner. The process presently disables many critical public safety functions such as traffic signals and streetlights and other public safety functions. This project will allow the State to control rolling outages in a less intrusive manner by accomplishing necessary emergency load reduction while allowing lighting, traffic lights, streetlights and other similar public safety devices to continue operating during "soft blackouts."
The objective of this project is to test Advanced Switches for Soft Blackouts. These switches are designed to turn off 240-volt appliances, while leaving on 120-volt circuits.
The goal of this project is to determine the impacts and consequences of opening one hot leg of 240-volt electric service on electrical appliances and equipment normally found in a residence. The project will also determine the impacts and consequences of connecting both legs of a standard residential service to one side of the transformer, effectively reducing residential service to 120-volts. Finally, the project will determine the effect of doing this to an entire house and group of homes.
In 2002, this contract was amended to expand the scope of the contract to include development of security devices and systems for protecting power plants and substations from terrorist attacks. Two primary research and development activities were included in this amendment. The first is to develop a truck-stopping device that can be attached to heavy-duty truck air brake systems. This device will be either radio or mechanically triggered and will stop heavy-duty trucks by activating their brake systems. The second work is the development of portable truck barriers that can be quickly erected to prevent heavy-duty trucks from crashing into secured areas of power plants or other critical electric transmission system facilities. Together these two technologies provide a systems approach to preventing terrorists with truck bombs from gaining access to critical areas.

**This project supports the PIER Program objective of:**

- Improving the reliability/quality of California’s electrical system by reducing the impact of electric power outages.

**Proposed Outcomes:**

1. Determine the technical and economic feasibility of using these advanced switches to implement soft blackouts versus complete blackouts during Stage three power emergencies.
2. Develop and test truck stopping devices and portable truck barriers for protecting power plants and substations.

**Project Status:**
The Contractor has determined that many household appliances can be safely operated on reduced voltages, but more importantly that appliances are not damaged when this occurs.
One configuration of the advanced switch used on distribution transformers is not technically feasible. Only the meter socket version is feasible. During 2004, the prototype meter socket version was run through automated durability testing at the contractor's laboratory. No abnormal cycling events were noted. Final test results of this testing will be included in the final report for this project which will be completed in early 2005.
Work on terrorist protection systems for power plants and substations continued in 2004. Working in collaboration with DOE, National Department of Homeland Security and California Highway Patrol, the contractor has successfully developed and tested the mechanical and remote controlled version of the truck-stopping device. The California Highway Patrol is testing these mechanical versions on the road presently with fuel tankers. The radio-controlled version of the truck-stopping device was also successfully developed and tested for applicable use at power plants and substations. Final operational testing of the remote controlled version of the truck-stopping device is slated for February 2005, results of which will be included in the contract final report.